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ABSTRACT

The impact of testing accommodation on the performance of students with limited English proficiency (LEP) was studied, focusing on the possibility of differential impact of accommodation strategies on subgroups formed based on students' background characteristics and the validity of assessments using accommodated versus nonaccommodated assessments. Using mathematics items from the National Assessment of Educational Progress, four accommodations were examined: (1) modified (simplified) English; (2) a glossary with definitions for potentially difficult nonmathematics terms; (3) extra testing time; and (4) the glossary plus extra time. The accommodated assessments were distributed to 900 middle school students, some of whom were LEP students. Receiving extra time had a favorable impact on student achievement, and extra time plus the glossary had the greatest positive effects. Results also suggest differential impact of accommodations on different subgroups of English language learners when characteristics of socioeconomic status, type of mathematics class, language of instruction, English proficiency, and time in the United States were considered. Determining the validity of the accommodated examinations was complicated, but results indicate that accommodation also significantly increases the performance level of non-LEP students. (SLD)

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NAEP Math Test Accommodations for Students with Limited English Proficiency

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NAEP Math Test Accommodations for Students with Limited English Proficiency

National Center for Research on Evaluation, Standards and Student Testing

Researchers at CRESST, in collaboration with the National Center for Education Statistics (NCES), studied the impact of accommodation on the performance of students with limited English proficiency. Two main issues were addressed. The first was the possibility of differential impact of accommodation strategies on the subgroups formed based on the students' background characteristics. The second issue was concern over the validity of assessments using accommodated versus non-accommodated assessments. In other words, does the presence of an "accommodation" affect the nature or quality of assessment?

Using NAEP math items (non-released items from 1996 Bilingual Spanish/English Math Assessment for 8th grade students), four accommodations were examined:

1) Modified (simplified) English
2) Presence of a glossary, with simplified definitions for non-math terms identified as potentially difficult for students with limited English proficiency to understand
3) Extra time
4) Glossary with extra time

These accommodated assessments were compared with the original English language test items (from the original NAEP assessment). Five test booklets were created, differing only by the type of accommodation offered. Test booklets were distributed randomly to students in middle school math classes in southern California (n=900), to control for teacher and school effects.

The results of our analyses suggest that receiving extra time impacts students' math performance significantly. Students who received extra time obtained a mean math score of about one point higher than students receiving the normal time allotment. Additionally, the presence of a glossary of non-math related terms had minimal effects on students' math performance. However, when the glossary was combined with receiving extra time, math performance appears to be the highest overall.

Further, there may be differential impact of accommodations on different subgroups of English language learners. Students' math performance (with accommodations) was compared across subgroups formed based on selected background characteristics believed to have the greatest impact on performance (e.g., SES, type of math class, language of instruction, students' English proficiency, number of years living in the U.S.). Analysis of covariance (with reading proficiency as a covariate) suggest significant interaction effects between various background variables and type of accommodation. This indicates a possible differential impact of accommodations on different subgroups of LEP students.

Examining the validity of accommodations is more complex since any improvement on students' performance could be either due to direct (planned)

actual accommodation effects, or to indirect (or unplanned) effects, or both. These sources of variation on students' math performance may be confounded.

Table 1 summarizes the results of descriptive analyses and presents mean and standard deviation for different groups of students under different forms of accommodation. The data in Table 1 indicate that:

- Both LEP and non-LEP students showed the greatest increases in performance when provided *both* a glossary and extra time.
- LEP scores were higher on all types of accommodation except Glossary Only. In other words, LEP students were helped by Modified English, Extra Time, and Glossary + Extra Time.
- Students who were better readers, as measured by Reading Test scores, achieved higher math scores.

Table 2 summarizes the results of analyses concerning differential impact of accommodation on students' performance. We compared the prediction power of two multiple regression models, a full model including background variables and their interaction with the accommodated assessment, and a restricted model which only included the background variables with no interaction with assessment. As the data in Table 2 suggest, including the interaction of background variables with the assessment, increases the power of prediction for assessment. The R^2 for the full model, with all interaction included, is 0.281 as compared to an R^2 of 0.251 for the restricted model. The difference between the two R^2 is statistically significant ($F = 4.66$, $p < .01$) which indicate that the effectiveness of a given accommodation strategy depends, to

some extent, on the background characteristics of the students for whom the accommodation is used.

We also examined the issues concerning the validity of accommodation by comparing the performance of non-LEP on the accommodated and non-accommodated sessions. The results of our study indicated that accommodation significantly increased the performance level of non-LEP. For example, with the original English form, the average math score for FEP/IFE students was 17.56 (SD = 6.70). With glossary + extra time, this average was increased to 20.37 (SD = 7.17), a significant difference above .01 nominal level (see Table 1). This significant increase suggests that accommodation significantly impacts students' performance. That is, students not receiving accommodation may be at disadvantaged.

Table 1. Mean NAEP Math Achievement Scores for 8th Grade Students (35 points possible)

Math Book	LEP Status		
	LEP	FEP/IFE	COLUMN AVERAGE
Original English	12.07 (SD=5.47; n=144)	17.56 (SD=6.70; n=130)	14.68 (SD=6.67; n=274)
Modified English	12.63 (SD=5.23; n=124)	15.94 (SD=6.67; n=117)	14.23 (SD=6.19; n=241)
Glossary only	11.84 (SD=5.94; n=146)	17.78 (SD=6.84; n=121)	14.53 (SD=7.01; n=267)
Extra Time only	12.93 (SD=5.99; n=30)	18.88 (SD=6.50; n=25)	15.64 (SD=6.86; n=55)
Glossary +Extra Time	13.69 (SD=6.74; n=29)	20.37 (SD=7.17; n=30)	17.08 (SD=7.68; n=59)
ROW AVERAGE	12.30 (SD=5.67; n=473)	17.45 (SD=6.83; n=423)	14.73 (SD=6.75; n=896)

Table 2. Summary of the analyses for impact on background variables on efficiency of accommodation strategies

Model Description	Criterion Variable	Predictors	R	R^2
Full Model, all background variables and their interactions	Total math score	9 main & 6 interaction variables	0.530	0.281
Restricted Model, all background vriables (no interactions included)	Total math score	9 main variables	0.500	0.251